	Complete if Known	
FEE TRANSMITTAL **for FY 2004** Patent fees are subject to annual revision	Application No.	09/944,569
	Filing Date	1/28/1998
	First Named Inventor	Gustavo D. Leizerovich
	Examiner Name	Aung T. Win
☐ Applicant claims small entity status. See 37 CFR 1.27	Group Art Unit	2645
TOTAL AMOUNT OF PAYMENT $500	Attorney Docket No.	CM03387J

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Deposit Account Number — 50-2117

Deposit Account Name — Motorola, Inc.

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee $	Small Entity Fee Code	Small Entity Fee $	Fee Description	Fee Paid
1001	770	2001	370	Utility filing fee	
1006	770	2006	370	Utility filing fee CPA	
1002	330	2002	165	Design filing fee	
1007	330	2007	165	Design filing fee CPA	
1003	510	2003	255	Plant filing fee	
1004	750	2004	370	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	
				SUBTOTAL (1)	($)

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

	Extra Claims		Fee from below		Fee Paid
Total Claims	5	-20* =		x 18 =	
Independent Claims	2	-3* =		x 36 =	
Multiple Dependent			280		

Large Entity Fee Code	Large Entity Fee $	Small Entity Fee Code	Small Entity Fee $	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	84	2201	42	Independent claims in excess of 3
1203	280	2203	140	Multiple dependent claim, if not paid
1204	84	2204	42	**Reissue independent claims over original patent
1205	18	2205	9	**Reissue claims in excess of 20 and over original patent
				SUBTOTAL (2) ($)

**or number previously paid, if greater. For Reissues, see above*

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge – late filing fee or oath	
1052	50	2052	25	Surcharge – late Provisional filing	
1053	130	1053	130	Non-English specification	
1812	2520	1812	2520	For filing a request for ex parte Reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1840*	1805	1840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within 1st month	
1252	410	2252	200	Extension for reply within 2nd month	
1253	930	2253	460	Extension for reply within 3rd month	
1254	1450	2254	720	Extension for reply within 4th month	
1255	1970	2255	980	Extension for reply within 5th month	
1401	320	2401	160	Notice of Appeal	
1402	330	2402	160	Filing a brief in support of an appeal	500
1504		1504		Publication fee for early, voluntary, or normal publication	
1403	280	2403	140	Request for oral hearing	
1505	300	1505	300	Publication fee for republication	
1451	1510	1451	1510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1300	2453	640	Petition to revive - unintentional	
1501	1300	2501	640	Utility issue fee (or reissue)	
1502	470	2502	230	Design issue fee	
1503	630	2503	310	Plant issue fee	
1460	130	1460	50	Petitions to the Commissioner	
1808	130	1808	130	Processing fee CFR 1.17(i)	
1807	50	1807	50	Processing fee for provisional appls.	
1806	180	1806	180	Submission of IDS	
8021	40	8021	40	Recording each patent assignment per property (times # of properties)	
1809	750	2809	370	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	750	2810	370	For each additional invention to be examined (37 CFR § 1.129(b))	
1801	750	2801	370	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	
1814	110	2814	55	Statutory Disclaimer	

Other fee (specify)
*Reduced by Basic Filing Fee Pd

SUBTOTAL (3) $500

SUBMITTED BY		Complete (if applicable)	
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Signature	*[signature]*	Telephone:	954-723-6449
		Date	July 3, 2006

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16

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Date:	July 3, 2006
To Examiner:	AUNG T. WIN
Location:	United States Patent and Trademark Office
Fax No.:	**Centralized Fax Number: 1 (571) 273-8300**
From:	Scott M. Garrett - Registration No. 39,988
Attorney's Docket No.	CM03387J Confirmation No. 2495

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In connection with the above-identified Patent Application, please find attached herewith the following documents:
-Transmittal Form;
-Fee tranmsittal;
-Brief in support of Appeal.

PLEASE DELIVER THESE PAPERS TO:

EXAMINER:	AUNG T. WIN
GROUP ART UNIT:	2645
SERIAL NO.:	09/944,569
FILED:	August 31, 2001
INVENTOR:	Gustavo D. Leizerovich

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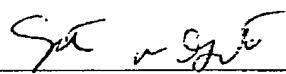
Application Number	09/944,569
Filing Date	August 31, 2001
First Named Inventor	Gustavo D. Leizerovich
Group Art Unit	2645
Examiner Name	Aung T. Win

ENCLOSURES (check all that apply)
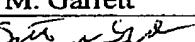
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[ ] Amendment/Reply	[ ] Petition	[X] Appeal Communication to Group (Appeal Notice, Brief, Reply Brief)
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[ ] Response to Missing Parts Under 37 CFR 1.52 or 1.53		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual	Scott M. Garrett	Registration No.	39,988
Signature	*[signature]*		
Date	July 3, 2006		

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Total Number of Pages in this Submission	16	Attorney Docket Number	CM03387J

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Before the Board of Patent Appeals and Interferences

Ex Parte:	Gustavo D. Leizerovich
Application Number:	09/944,569
Filing Date:	August 31, 2001
Title:	METHOD AND APPARATUS FOR OPTIMIZING SUPPLY MODULATION IN A TRANSMITTER
Group:	2645
Examiner:	AUNG T. WIN

BRIEF ON BEHALF OF APPELLANTS UNDER 37 CFR 41.37

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CONTENTS

I.   REAL PARTY IN INTEREST

The name of the real party in interest for purposes of this appeal is Motorola, Inc., a Delaware corporation.

II.   RELATED APPEALS AND INTERFERENCES

There are no other appeals of interferences known to the Applicant, the Applicant's legal representative, or assignee which would directly affect or be directly affected by or having a bearing on the Board's decision in this pending appeal.

III.   STATUS OF CLAIMS

Claims 1-18 remain in the application. Claims 1-18 are being appealed. Claims 1-18 stand or fall together. In the final Office Action dated November 3, 2005, the Examiner rejected Claims 1-18. Claims 1 & 7 were rejected under 35 USC 112, first paragraph as failing to comply with the written description requirement. Claims 1, 7, and 13 were rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1, 2, 4, 5, 7, 8, 10, 11, 13, 14, 16, and 17 were rejected under 35 USC 102(b) as being anticipated by Su (US Patent No. 5,847,602). Claims 3, 9, and 15 were rejected under 35 USC 103(a) as being obvious over Su in view of Gailus (US Patent No. 5,066,923). Claims 6, 12, and 18 were rejected under 35 USC 103(a) as being obvious over Su in view of Williams (US Patent No. 6,052,568).

IV.   STATUS OF AMENDMENTS

A Response to a first rejection dated February 24, 2005 was filed July 21, 2005, amending claims 1, 7, 13, and 16-18. Claims 1-18 were finally rejected on November 3, 2005.

V.   SUMMARY OF CLAIMED SUBJECT MATTER

The invention provides in one embodiment a method for optimizing supply modulation in a transmitter includes providing a signal to be transmitted which has an envelope. The method further includes providing a modulation signal to a power regulator. The power regulator then provides a supply voltage to a radio frequency power amplifier (RFPA) corresponding with the

modulation signal. The modulation signal substantially corresponds to the envelope of the signal to be transmitted. The method further includes comparing an actual signal to be transmitted by the RFPA with an expected signal at a point in the transmitter prior to the RFPA, and adjusting the modulation signal in response to detecting a deviation of the actual signal to be transmitted from the expected signal to maintain a desired compression level of the RFPA. By modulating the RFPA supply voltage in accordance with the invention, power efficiency of the RFPA is optimized. These and other embodiments are shown and described in FIGs. 2-4, elements 202, 304, 214, 206, 316, 426, 308, 312, 318. The elements are described at page 3, line 27 to page 8, line 21.

The invention provides in another embodiment a transmitter for optimizing a supply modulation. The transmitter includes a radio frequency power amplifier (RFPA) for amplifying a low level RF signal and providing an amplified RF signal. The RFPA is powered by a power supply which provided power to the RFPA in correspondence with a modulation signal supplied to the power supply. A means for generating an envelope of a signal to be transmitted, such as a digital signal processor including a digital to analog converter, provides the modulation signal to the power supply. The modulation signal substantially corresponds to the envelope of the signal to be transmitted. The transmitter further includes a means for comparing an actual signal to be transmitted by the RFPA with an expected signal at a point in the transmitter prior to the RFPA, wherein the modulation signal is adjusted in response to detecting a deviation of the actual signal to be transmitted from the expected signal to maintain a desired compression level of the RFPA. These and other embodiments are shown and described in FIGs. 2-4, elements 202, 304, 214, 206, 316, 426, 308, 312, 318. The elements are described at page 3, line 27 to page 8, line 21.

Another embodiment of the invention provides a method of modulating a supply voltage supplied to a radio frequency power amplifier (RFPA) in a transmitter including providing a signal to be transmitted. The signal to be transmitted having an envelope. The method further includes providing a modulation signal to a power regulator. The power regulator provides the supply voltage to the RFPA. The modulation signal substantially corresponds to the envelope of the signal to be transmitted. The method further includes adjusting the modulation signal to avoid excess gain compression at a gain stage of the transmitter. Adjusting the modulation signal deviates the modulation signal from autonomous correspondence with the envelope of the signal to be transmitted. These and other embodiments are shown and described in FIGs. 2-4, elements 202, 304, 214, 206, 316, 426, 308, 312, 318. The elements are described at page 3, line 27 to page 8, line 21.

VI.   GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 1 & 7 are patentable under 35 USC 112, first paragraph as complying with the written description requirement.

Whether Claims 1, 7, and 13 are patentable under 35 USC 112, second paragraph, as particularly pointing out and distinctly claiming the subject matter which applicant regards as the invention.

Whether claims 1, 2, 4, 5, 7, 8, 10, 11, 13, 14, 16, and 17 are patentable under 35 USC 102(b) over Su (US Patent No. 5,847,602).

Whether claims 3, 9, and 15 are patentable under 35 USC 103(a) over Su in view of Gailus (US Patent No. 5,066,923).

Whether claims 6, 12, and 18 are patentable under 35 USC 103(a) over Su in view of Williams (US Patent No. 6,052,568).

VII.   ARGUMENT

Claims 1 & 7 are patentable under 35 USC 112, first paragraph as complying with the written description requirement. The Final Rejection contends that claims 1 and 7 claim subject matter that was not described in the specification. Specifically that comparing is accomplished by an actual signal to be transmitted being compared with an expected signal at a point in the transmitter prior to the RFPA. However, in FIG. 3, a signal at the output of the RFPA 312 is shown fed to a compression detection means 318. A signal taken at a point prior to the RFPA 308 is also fed to the compression detection means. Similarly, in FIG. 4, a signal at 406 and at 428 are fed to the compression detector. Signal 406 is taken at a point before the RFPA. Signal 428, due to the feedback from 416 to the IQ down mixer 418 back into the transmitter path, is representative of the actual signal to be transmitted. A description of this comparison is provided on page 8, lines 7-21, where it is described that the compression detector can compare the expected signal with the actual signal. Accordingly, claims 1 & 7 comply with the written description requirement.

Claims 1, 7, and 13 are patentable under 35 USC 112, second paragraph, as particularly pointing out and distinctly claiming the subject matter which applicant regards as the invention.

In <u>Verve, LLC v. Crane Cams, Inc.</u>, 311 F.3d 1116, 1120 (Fed. Cir. 2002), the Federal
Circuit held:

> "Expressions such as "substantially" are used in patent documents when
> warranted by the nature of the invention, in order to accommodate the minor
> variations that may be appropriate to secure the invention. Such usage may well
> satisfy the charge to "particularly point out and distinctly claim" the invention, 35
> U.S.C. §112, and indeed may be necessary in order to provide the inventor with
> the benefit of his invention....

> "It is well established that when the term "substantially" serves reasonably to
> describe the subject matter so that its scope would be understood by persons in the
> field of the invention, and to distinguish the claimed subject matter from the prior
> art, it is not indefinite. Understanding of this scope may be derived from extrinsic
> evidence without rendering the claim invalid."

The use of the term "substantially" in independent claims 1, 7, and 13 serves to
indicate that minor variations from "perfect" correspondence will still allow the invention
to operate. The term as used by Applicant would be understood by persons reasonably
skilled in the art to account for such minor variations introduced by, for example,
semiconductor noise, quantization noise, and so on, as are reasonably likely to be
encountered in constructing a device in accordance with the teachings of the present
application. Furthermore, Applicant contemplated that the envelope signal may be band
limited, at page 4, lines 27, to page 5, line 6. Thus, the term "substantially
corresponding" would be understood by those skilled in the art.

Claims 1, 2, 4, 5, 7, 8, 10, 11, 13, 14, 16, and 17 are patentable under 35 USC 102(b)
over Su (US Patent No. 5,847,602).

> MPEP § 2131 provides:
> A claim is anticipated only if each and every element as set forth in the claim is
> found, either expressly or inherently described in a single prior art reference."
> *Verdegaal Bros. v. Union Oil Co. of California*, 814 F. 2d 628, 631, 2 USPQ2d
> 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as
> complete detail as contained in the ... claim." *Richardson v. Suzuki Motor Co.*,

868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim ....

Su describes a delta modulated power amplifier that is linearized with envelope difference feedback. A low-level RF signal is fed to a magnitude amplifier path 30 and a phase amplifier path 40. In the magnitude amplifier path an envelope detector 33 is used to sample the magnitude of the low level RF signal. The envelope is fed to a clocked difference detector 23, which compares the difference of the envelope of the low level RF signal with the envelope of the output of a final amplifier stage. This provides linearization of the modulating signal powering the output stage amp. It does not address gain compression.

In rejecting claim 1, Examiner contends that Su shows Applicant's claim element of "comparing an actual signal to be transmitted with an expected signal at some point in the transmitter," and points to the output of envelope detector 33 of Su as providing an "expected signal." and the output of envelope detector 34 as providing the actual signal to be transmitted. Respectfully, that comparison is inaccurate.

The output of either envelope detector is not an "expected signal." The expected signal as claimed by Applicant, is not analogous to anything in Su because the expected signal does not actually exist in the transmitter, and is determined by, for example, a digital signal processor, as described in the instant application on page 8, lines 12-14. Hence, Applicant carefully chose the term "expected signal" to differentiate it from an actual signal. All of the signals in Su are 'actual' signals. As described by Applicant, the actual signal to be transmitted is, for example, an amplified baseband signal 428, not an envelope signal as in Su. The expected signal may be determined by, for example, multiplying an input signal 406 by an expected gain factor. Ordinarily the ratio will remain constant, but occasionally deviations may occur due to compression, as indicated in graph 504.

In making the Final Rejection, it is contended that the aspect of the expected signal not actually being evident in the transmitter is not a limitation of the claims. However, it is an inherent limitation established by the context of the claim language. In comparing an actual signal with an expected signal, it is reasonably assumed the expected signal is known or determined *a priori*, while the actual signal is obtained through measurement. The specification at page 8, lines 12-14 teaches that the expected signal may be determined by calculation or look-up table, for example. Thus, one of ordinary skill in the art, upon reading the specification,

would be reasonably informed that the term "expected signal" as used in the claims refers to determined or calculated signal value, as opposed to a measured or actual signal value.

As Su does not show the use of an expected signal, Su cannot then show Applicant's claim element of "adjusting the modulation signal in response to detecting a deviation of the actual signal to be transmitted from the expected signal."

Additionally, the adjusting performed here is distinct from conventional envelope tracking, which is what is performed by Su's magnitude amplifier path 31, and what is claimed by Applicant's claim element of "providing a modulation signal to a power regulator,...the modulation signal substantially corresponding to the envelope of the signal to be transmitted," before the element of adjusting the modulation signal in claims 1, 7, and 13. Applicant is not merely repeating the limitation of envelope tracking, although Examiner cites the same elements of Su for both of Applicant's claim limitations. Adjusting the modulation signal, then, as claimed by Applicant, must necessarily be read to be different then the envelope tracking recited earlier in each of Applicant's independent claims. Indeed, as described on page 8. lines 17-21, adjusting the modulation signal means to deviate the modulation signal from ordinary envelope tracking. Applicant has amended this limitation in claims 1 and 7 to indicate that the adjusting is performed to maintain a desired gain compression of the RFPA. As indicated on page 5, lines 6-12 of the instant application, the gain of the RFPA and other transmitter characteristics can change due to, for example, thermal drift. Assuming arguendo that Su's difference detector maintains gain compression, it does maintain gain compression as transmitter component characteristics change; Su does not describe, for example, adjusting the gain of the class D amplifier 37, or the attenuator 39, or any other component in the envelope tracking circuit to account for such changes.

Accordingly, Applicant believes amended independent claims 1, 7, and 13 are not anticipated by Su, and are allowable over Su. Claims 2, 4, 5, 8, 10, 11, 14, 16, and 17, also rejected as being anticipated by Su, are then allowable as being dependent on allowable claims.

Claims 3, 9, and 15 are patentable under 35 USC 103(a) over Su in view of Gailus (US Patent No. 5,066,923).

The argument with respect to Su applies to these claims as well, and as these claims are dependent on independent claims rejected as being anticipated by Su, they are believed to be allowable over Su in view of Gailus.

Claims 6, 12, and 18 are patentable under 35 USC 103(a) over Su in view of Williams (US Patent No. 6,052,568)

The argument with respect to Su applies to these claims as well, and as these claims are dependent on independent claims rejected as being anticipated by Su, they are believed to be allowable over Su in view of Williams.

For the reason set forth above, Applicant submits that claims 1-18 are patentable over Su, over Su in view of Gailus, and over Su in view of Williams, and request that the Board withdraw the rejection.

Respectfully submitted,

Gustavo D. Leizerovich

by: _____
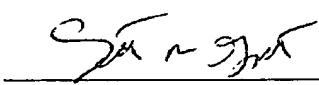
Scott M. Garrett

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VIII.   <u>CLAIMS APPENDIX</u>

1. A method for optimizing supply modulation in a transmitter, comprising:

providing a signal to be transmitted, the signal having an envelope;

providing a modulation signal to a power regulator, the power regulator for providing a supply voltage to a radio frequency power amplifier (RFPA), the modulation signal substantially corresponding to the envelope of the signal to be transmitted;

comparing an actual signal to be transmitted by the RFPA with an expected signal at a point in the transmitter prior to the RFPA; and

adjusting the modulation signal in response to detecting a deviation of the actual signal to be transmitted from the expected signal to maintain a desired compression level of the RFPA.

2. A method for optimizing supply modulation as defined in claim 1, further comprising linearizing the signal to be transmitted.

3. A method for optimizing supply modulation as defined in claim 2, wherein the linearizing comprises linearizing by cartesian feedback.

4. A method for optimizing supply modulation as defined in claim 3, wherein the comparing comprises comparing reference baseband signals with summed baseband signals.

5. A method for optimizing supply modulation as defined in claim 1, wherein the comparing comprises comparing a low level RF signal with an amplified RF signal at the input and output, respectively, of the RFPA.

6. A method for optimizing supply modulation as defined in claim 1, wherein the comparing is performed by a digital signal processor.

7. A transmitter for optimizing a supply modulation, comprising:

a radio frequency power amplifier (RFPA) for amplifying a low level RF signal and providing an amplified RF signal;

a power supply for providing power to the RFPA in correspondence with a modulation signal supplied to the power supply;

a means for generating an envelope of a signal to be transmitted and providing the modulation signal to the power supply, the modulation signal substantially corresponding to the envelope of the signal to be transmitted; and

a means for comparing an actual signal to be transmitted by the RFPA with an expected signal at a point in the transmitter prior to the RFPA;

wherein the modulation signal is adjusted in response to detecting a deviation of the actual signal to be transmitted from the expected signal to maintain a desired compression level of the RFPA.

8. A transmitter for optimizing a supply modulation as defined in claim 7, further comprising means for linearizing the signal to be transmitted.

9. A transmitter for optimizing a supply modulation as defined in claim 8, wherein the means for linearizing comprises cartesian feedback.

10. A transmitter for optimizing a supply modulation as defined in claim 9, wherein the means for comparing compares reference baseband signals with summed baseband signals in the transmitter.

11. A transmitter for optimizing a supply modulation as defined in claim 7, wherein the means for comparing compares a low level RF signal with an amplified RF signal at the input and output, respectively, of the RFPA.

12. A transmitter for optimizing a supply modulation as defined in claim 7, wherein the means for comparing comprises a digital signal processor.

13. A method of modulating a supply voltage supplied to a radio frequency power amplifier (RFPA) in a transmitter, comprising:

providing a signal to be transmitted, the signal having an envelope;

providing a modulation signal to a power regulator, the power regulator for providing the supply voltage, the modulation signal substantially corresponding to the envelope of the signal to be transmitted; and

adjusting the modulation signal to avoid excess gain compression at a gain stage of the transmitter, wherein adjusting the modulation signal deviates the modulation signal from autonomous correspondence with the envelope of the signal to be transmitted.

14. A method of modulating a supply voltage as defined in claim 13, further comprising linearizing the signal to be transmitted.

15. A method of modulating a supply voltage as defined in claim 14, wherein the linearizing comprises linearizing by Cartesian feedback.

16. A method of modulating a supply voltage as defined in claim, wherein adjusting the modulation signal comprises comparing reference baseband signals with summed baseband signals.

17. A method of modulating a supply voltage as defined in claim 13, wherein adjusting the modulation signal comprises comparing a low level RF signal with an amplified RF signal at the input and output, respectively, of the RFPA.

18. A method of modulating a supply voltage as defined in claim 16, wherein the comparing is performed by a digital signal processor.

IX.   EVIDENCE APPENDIX

No evidence has been submitted pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132, entered by the examiner and relied upon by the appellant in the appeal, or relied upon by the examiner as to grounds of rejection to be reviewed on appeal.

X.   RELATED PROCEEDINGS APPENDIX

No decisions have been rendered by a court of the Board in any proceeding identified pursuant to paragraph (c)(1)(ii) of 37 C.F.R. § 41.37.